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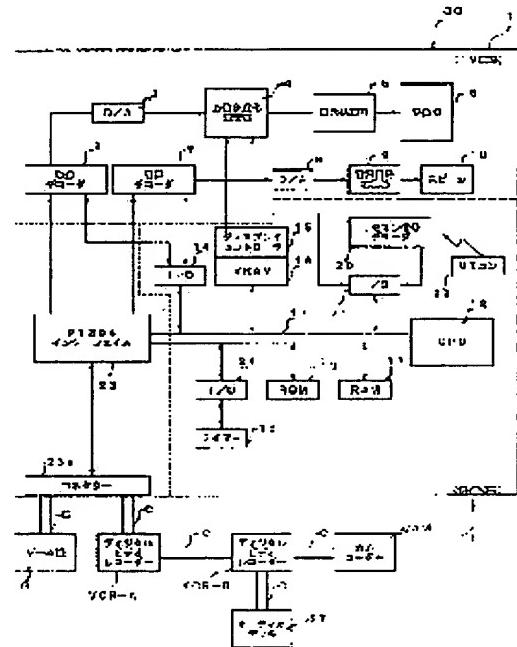
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## (54) AV SYSTEM CONSISTING OF DISPLAY DEVICE CONNECTED TO PLURAL AV EQUIPMENTS

### (57)Abstract:

**PROBLEM TO BE SOLVED:** To easily recognize the connection form of the flow of video signals and audio signals by visualizing the input/output conditions of the video signals and/or the audio signals between connected AV equipments and displaying the connection state of the flow.

**SOLUTION:** In this AV system composed of the plural AV equipments and a display device connected to the AV equipments, the number of the connection of the AV equipments connected at present and a logical address chart for controlling the respective AV equipments are prepared in the RAM 17 of a control circuit 11. Then, to the respective AV equipments, the kind of the AV equipments, what kind of signals are outputted to which channel at present and which is the logical address of the AV equipment of the output destination are inquired and the table of the connection form is prepared on the RAM 17. Then, by using the logical address chart of the respective equipments and a signal input/output table, the connected AV equipments and the connection state of the flow of the audio signals and the video signals are plotted on a screen by a GUT.



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**CLAIMS**

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**[Claim(s)]**

[Claim 1] the video signal between each AV equipment by which is AV system which consists of a display unit linked to two or more AV equipments and this AV equipment, and connection is made [ aforementioned ] at the aforementioned display unit --- and --- or AV system which consists of a display unit linked to two or more AV equipments characterized by displaying the connection state of the flow of a sound signal on a screen

[Claim 2] the aforementioned video signal --- and --- or AV system which consists of a display unit linked to two or more AV equipments according to claim 1 characterized by displaying the display of a up to [ the screen of the connection state of the flow of a sound signal ] by according to color

[Claim 3] the aforementioned video signal --- and --- or AV system which consists of a display unit linked to two or more AV equipments according to claim 1 characterized by the connection state of the flow of a sound signal making a setting change suitably on the screen displayed on the aforementioned display unit

[Claim 4] the video signal between each AV equipment which is AV system which consists of a display unit connected through two or more AV equipments, these AV equipments, and digital interfaces, and made [ aforementioned ] connection at the aforementioned display unit --- and --- or AV system which consists of a display unit linked to two or more AV equipments characterized by displaying the connection state of the flow of a sound signal on a screen

[Claim 5] The aforementioned digital interface is an AV system which consists of a display unit linked to two or more AV equipments according to claim 4 characterized by giving equal communication time periodically to each AV equipment possible and connected [ connects two or more aforementioned AV equipments to a daisy chain, and ] by the packet method based on IEEE1394 specification.

[Claim 6] the aforementioned video signal --- and --- or AV system which consists of a display unit linked to two or more AV equipments according to claim 4 characterized by performing the display of a up to [ the screen of the connection state of the flow of a sound signal ] by according to color

[Claim 7] the aforementioned video signal --- and --- or AV system which consists of a display unit linked to two or more AV equipments according to claim 4 characterized by the connection state of the flow of a sound signal making a setting change suitably on the screen of the aforementioned display unit

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[Translation done.]

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**DETAILED DESCRIPTION**

[Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] the video signal between the AV equipments connected on the screen of a display unit in the display unit to which this invention connected two or more AV equipments -- and -- or it is related with AV system which displayed the connection state of the flow of a sound signal, and enabled setting change of a connection state on the screen suitably

[0002]

[Description of the Prior Art] When connecting AV equipments, such as graphic display machines and videos, such as the display unit linked to two or more AV equipments which can be set on the conventional technology, for example, a television receiver etc., and audio equipment, changing the sound signal of each AV equipment, and a video signal to an input and an output and performing reproduction of an image, videotape recording, etc., the bond frog method is common knowledge directly about the topology between each AV equipment. for example, "video -- video" -- the case where he wants to dub in between -- direct -- " -- video out -- the purpose called dubbing can be attained by connecting and changing the cable of video in" and performing reproduction and videotape-recording recording, respectively

[0003] Moreover, there is also the method of realizing combining the terminal of the input which each AV equipment has, and an output. For example, when outputting the image output of a videocassette recorder to a television receiver and outputting voice to a stereo, it can realize by changing the voice input of a stereo to an external input, and changing the input change of a television receiver to an external input. When the number of the AV equipments to connect increases, there is also the method of connecting and changing the voice of each AV equipment and all the image inputs to AV selector.

[0004] Furthermore, visual [ operate / by GUI on a television receiver (Graphic User Interface) / by outputting the video signal from such an AV selector on a television receiver for example, ] A touch (Visual Touch) also exists.

[0005]

[Problem(s) to be Solved by the Invention] However, in AV system in the conventional technology which gave [ above-mentioned ] explanation, when a video signal and a sound signal are analog signals, in case an I/O signal is changed on AV selector, there is a trouble referred to as considering a video signal and a sound signal to be the same channels, and changing them.

[0006] What visualizes the flow of I/O of a video signal and a sound signal intelligibly temporarily though the fine change of the video signal for every AV equipment and a sound signal can be performed does not exist.

[0007] When the environment which connected the AV equipment is moreover digitized, especially a topology with the as logical sound signal [ a video signal and a sound signal ] naturally at one physical path cord between AV equipments as the topology of a cable physical in transmission and reception becoming possible together becomes unnecessary to be in agreement, and there is a trouble referred to as unsolvable with the concept of the conventional AV switcher.

[0008] therefore, the display unit linked to two or more AV equipments -- setting -- especially -- a video signal -- and -- or it has the technical problem which the connection state of the flow of a sound signal must solve in the composition it enabled it to understand easily by viewing [0009]

[Means for Solving the Problem] the video signal between two or more AV equipments to which the display unit which connected with two or more AV equipments AV system which consists of a display unit connected with two or more AV equipments concerning this invention in order to solve the above-mentioned technical problem is connected -- and -- or it is having displayed the connection state of a sound signal on the screen, and it is making it display according to a color preferably, and having been made to make a setting change on the screen suitably

[0010] moreover, the video signal between two or more AV equipments and two or more AV equipments which connected the connectable display unit through the digital interface -- and -- or it is displaying the connection state of a sound signal on a screen, and displaying by according to color preferably, and having been made to make a setting change on the screen suitably

[0011] The display unit which connected two or more AV equipments made the above-mentioned composition can view easily the topology of a video signal and a sound signal, i.e., the flow state of a signal, on a screen, and can perform now easily correspondence with the physical connection state between two or more AV equipments, and the theoretical connection state which is the flow of a video signal and a sound signal.

[0012]

[Embodiments of the Invention] The gestalt of desirable operation of AV system which consists of a display unit linked to two or more AV equipments concerning this invention has the composition of having connected the AV equipment of variety a large number through the digital interface (henceforth 1394IF) based on IEEE1394 specification, as shown in drawing 1.

[0013] 1394IF is explained here. 1394IF is the so-called serial buses which can connect two or more AV equipments by the daisy chain, and each AV equipment forms the node in 1394IF. A branch can also be taken out from each node. Connection of each AV equipment is arbitration unless a loop is formed.

[0014] In drawing 1, two branches have come from television-receiver TV, and one of them is connected with the digital camcorder DCAM. namely, to another branch Digital videocassette recorder VCR-A, VCR-B, and VCR-C, A digital video disc DVD, game machine G, and Telephone TEL Facsimile FAX, the music disk-swapping machine MDC, the digital audio tape recorder DAT and the compact disk exchange CDC, Printer P, and infrared equipment IRU are connected to the daisy chain by the P1394 cable C.

[0015] 1394IF which has such a function consists of the same connector connected to the ends of the P1394 cable C of the 6 heart, and a cable, the LSI-ized physical layer which was connected to each connector, an LSI-ized link layer which was connected with the physical layer, and a transaction layer connected with the link layer. A transaction layer consists of a firmware.

[0016] The P1394 cable C consists of two pairs of shielding wire, and two power supply lines. Two of pairs of it are with the data line and a strobe line, they are used for data transfer, and are used as other power supply lines. Therefore, since the device on which the power supply has fallen can also make a signal bypass, it can send a signal to a previous device from the device on which the power supply has fallen.

[0017] The transceiver is built in the connector and the repeater is formed in it by this transceiver and the P1394 cable C. The end of a physical layer is connected with the P1394 cable C, and the other end is connected with the link layer. A physical layer decrypts the code data received from the link layer to an electrical signal, and sends them out to the P1394 cable C while it encodes the electrical signal inputted from the P1394 cable C and sends it to a link layer. A physical layer performs the below-mentioned bus arbitration etc. again.

[0018] A link layer decodes the packet received from the transaction layer while creating a packet based on the data encoded by the physical layer and transmitting to a transaction layer. Moreover, a link layer controls the transfer cycle of a packet.

[0019] 1394IF constituted as mentioned above has the following feature.

(1) Since the connection between AV equipments is serial, it can communicate with other AV equipments without all AV equipments' needing a switch connection like AV switcher prepared in the above-mentioned conventional television-receiver TV.

(2) The AV equipment in AV system is not fixed, but it can equip or secede from it freely in the arbitrary positions in AV system by \*\*\*\*(ing) a connector. At this time, it reconfigures ID of each AV equipment automatically.

[0020] (3) It has a bus arbitration (mediation) function for a specific AV equipment not monopolizing a serial bus. This transmits data per packet and the packet size is restricted to a maximum of 512 bytes (in the case of a 100M bit per second transfer rate, it is equivalent to about 40micro second). As for each AV equipment, only each allocation time performs packet transmission in order of the node number specified.

[0021] (4) A packet is an always fixed time interval, and it has come to be unable to perform a transfer of other packets until it is sent out from a link layer and the transfer is completed. Each AV equipment will judge whether it is data required for itself, if a packet is received, and it processes or disregards it based on the judgment result.

[0022] (5) There are an ordinary packet, an urgent packet with a high priority, and the below-mentioned isochronous packet with a still higher priority in a packet.

(6) The P1394 cable C is thin, and since the connector is small, leading about of the P1394 cable C and its attachment and detachment of a connector are easy for it. Moreover, cost is cheap.

[0023] (7) The transfer rate of a signal is quick as compared with the conventional serial transfer. This is because it reads with DS link method which sends a signal by serial transfer (transfer per bit) using one pair of data lines, and one pair of strobe lines, and follows the rule of "reading the data of the data line when one of the potentials of the data line or a strobe line change." This DS link method corresponds to the time shake of the potential of the data line. It becomes unnecessary to insert the conventional start bit and conventional stop bit like a serial transfer (for example, RS232C) at intervals of 8 bits by this, and a transfer rate improves.

[0024] Next, the control center CC side of a television receiver is explained to the Lord of AV system which consists of a display unit linked to two or more AV equipments connected with the digital interface based on IEEE1394 specification.

[0025] in addition, it comes out not to mention all based on this specification being contained, without being limited to this, although explained on the basis of IEEE1394 specification in the form of this operation

[0026] AV system equipped with the display unit linked to two or more AV equipments is constituted by a control center CC, and the P1394 cable C and two or more AV equipments (for example, the digital videocassette recorder VCR) as shown in drawing 2.

[0027] The control center CC consists of a TV circuit 1, a control circuit 11, and a P1394 interface 23.

[0028] The TV circuit 1 has the video-signal processor and the sound signal processor like the usual TV circuit. a video-signal processor The image decoder 2 which decodes the digital video signal inputted from the P1394 interface, D/A converter 3 which changes into an analog signal the video signal decoded by the image decoder 2, The picture multiplexing processing section 4 equipped with GUI (graphic user interface) which superimposes the analog video signal changed by D/A converter 3, the message signal from a display controller mentioned later (superimposition), It consists of the display-processing section 5 which reorganizes to a display the image data processed in the picture multiplexing processing section 4, and a receiving set 6 which displays the output of the display-processing section 5 on screens, such as the Braun tube.

[0029] Moreover, the sound signal processor of the TV circuit 1 consists of the voice decoder 7 which decodes the digital sound signal inputted from the P1394 interface 23, D/A converter 8 which changes into an analog signal the sound signal decoded by the voice decoder 7, sound signal amplifier 9 which amplifies the analog sound signal changed by D/A converter 8, and a loudspeaker 10 which changes into sound the sound signal amplified with the sound signal amplifier 9.

[0030] The bus 13 to which a control circuit 11 connects between CPU12, CPU12, and the

P1394 interfaces 23, The I/O circuit 14 which intervenes between the image decoder 2 and the voice decoder 7, and a bus 13, The display controller 15 and VRAM16 which intervene between a bus 13 and the picture multiplexing processing section 4, The nonvolatile RAM 17 connected to the bus 13, respectively, and the timer 18 connected through the I/O circuit 24, ROM19 and the remote control signal decoder 20 which receives and decodes the data from a remote control signal and a bus 13, It consists of an I/O circuit 21 which transmits and receives the data on a bus 13 to this remote control signal decoder 20, and portable remote control 22 which transmits a remote control signal.

[0031] CPU12 performs the program mentioned later. A bus 13 is the usual CPU bus. The I/O circuit 14 controls the timing of input and output of the image decoder 2 and the voice decoder 7 by the bottom of control of CPU12.

[0032] A display controller 15 creates the message data for one screen of a receiving set 6 etc. on VRAM16 under control of CPU12, and sends this to the picture multiplexing processing section 4.

[0033] Nonvolatile RAM 17 has memorized information, such as a history of the AV equipment composition connected to the P1394 interface 23. A timer 18 consists of a counter and carries out counting of the real time. ROM19 is memory only for read-out which stores a program.

[0034] The P1394 interface 23 has connector 23a connected to the circuit LSI-ized by IEEE1394 bus specification and this circuit. The plug of the P1394 cable C is inserted in this connector 23a. The function of this P1394 interface 23 is carried also in the AV equipment side connected.

[0035] The P1394 cable C is a cable which consists of six core wires, and has connected between a control center CC and AV equipments to series one by one. The P1394 cable C is connected one by one so that a loop may not be made, as mentioned above. In addition, in drawing 2 and drawing 3, in order to explain the summary of this invention, it has the composition of having connected three sets of digital videocassette recorder VCR-A, VCR-B, and VCR-C to series, having connected game machine G to the anode side of another side, and having connected the audio deck ST to one anode side further at the anode side of another side of digital videocassette recorder VCR-B.

[0036] As already stated as a feature of IEEE1394 specification, in this P1394 interface 23, it detects the AV equipment newly having been connected or having been removed by the P1394 cable connected to the socket, and has in it the function to tell CPU12 about that.

[0037] That is, the P1394 interface 23 sends the signal (henceforth a connection signal) which shows that to CPU12, when an AV equipment is newly connected or removed.

[0038] CPU12 has the function to perform change of AV equipment composition, a display, the automatic setting of a tuner and the display that are the setup 18 of the newly connected AV equipment, for example, a timer, and a channel selection means, the display of the removed AV equipment, etc., by making the above-mentioned connection signal into a trigger.

[0039] two or more image data and voice data from two or more AV equipments connected to the control center CC side which consists of such composition outside through the P1394 cable, for example, digital videocassette recorder VCR-A, and VCR-B -- a digital signal -- a packet -- it is-sizing and transmitted

[0040] Here, since it mentioned above about packet-ization of image data and voice data, it omits. In the image decoder 2 which incorporates image data, it has simultaneously the function which can be decoded for the packet-ized animation of two or more channels.

[0041] This image decoder 2 is controlled from CPU12 through the I/O circuit 14, and can choose whether it chooses which image channel on the bus 13 of the P1394 interface 23 it is, and decodes. Moreover, in the voice decoder 7, the voice corresponding to the specific image channel shall be decoded. That is, it has the function which chooses the specific channel of the video signal transmitted through the P1394 interface 23, and a sound signal.

[0042] The data of an image and voice are changed into an analog signal by D/A converters 3 and 8, respectively, an analog sound signal is outputted to a loudspeaker 10 through the sound signal amplifier 9, and an analog video signal is outputted to the screen of a receiving set 6 by the display-processing section 5.

[0043] Graphical data, such as an icon display of the AV equipment it is displayed on the screen of a television receiver that mentioned above on the other hand, shall be stored in ROM19, and this data is written in VRAM16 through a bus 13. The VRAM address which is a display position at the time of being written in is controlled by CPU12 through a bus 13. When processing of a superimposition etc. is performed by the picture multiplexing processing section 4, image data and graphical data are multiplexed and it is displayed on a receiving set 6 by the display controller 15 here.

[0044] On the other hand, the signal by remote control 22 is processed by the remote control signal decoder 20, and is analyzed by CPU12 as a remote control code through the I/O circuit 21 for whether it is that which button on remote control 22 was pushed. A timer 18 is used in order to process interruption of fixed time etc., and it is controlled by CPU12 through the I/O circuit 24.

[0045] On the screen of television-receiver TV possessing the control center CC which consists of such composition, a list indication which shows the connection state of the flow of the video signal from two or more connected AV equipments and the flow of a sound signal can be given. It explains in full detail below.

[0046] In addition, in an example, as described above, as shown in drawing 3, the connection state of the flow of a video signal and a sound signal will be considered through the P1394 cable C two or more AV equipments and here on the basis of two sets of digital videocassette recorder VCR-A, VCR-B, game machine G, and the composition that connected the audio component stereo ST with Camcorder CAM.

[0047] And as mentioned above, the terminator attached to cable both termination like [ the connection method between AV equipments is connected by the daisy chain which was similar with connection methods, such as SCSI and ] SCSI is unnecessary, and has composition based on IEEE1394 specification.

[0048] the capacity which the function of digital videocassette recorder VCR-A and VCR-B has encoding/decoding capacity of AV stream identifier, and packetizes the digital image data which are a record medium, and which are recorded, for example on the magnetic tape, and transmits on the bus 13 of the P1394 interface 23 -- a packet -- it has the capacity which decodes the image data on the bus 13-izing [ a bus ] and sent, and records on the magnetic tape which is a record medium

[0049] Moreover, a certain channel shall be assigned to digital videocassette recorder VCR-A and VCR-B. For example, digital videocassette recorder VCR-A assigns "a channel 10" and digital videocassette recorder VCR-B like "a channel 20."

[0050] About game machine G, it shall have the function in which AV stream identifier encodes a video signal and a sound signal, and shall not have the function which decodes.

[0051] It shall be related with the audio deck ST and shall have the function which encodes / decodes only voice data.

[0052] A topology with the physical feature as a network through the bus connected by the daisy chain based on IEEE1394 specification when each AV equipment had such a function. If each AV equipment which especially the logical topology of a video signal and a sound signal does not need to be in agreement, and is connected is equipped with a P1394 interface, and the encoder / decoder function of the stream identifier in packet communication Even if the video signal and the sound signal exist in which portion that forms a network, it is shown that it can transmit and receive. Here, if a stream identifier is the case of a video signal, it is included in the specific position of a video signal, and consists of data constellations which determine an image method, quality of image, etc.

[0053] Now, in AV system which has the physical connection state shown in drawing 3 in the form of this operation, the digital camcorder CAM shall be in a reproduction state, and the video signal shall be inputted into digital videocassette recorder VCR-A. Moreover, it shall suppose that the video signal of game machine G is inputted into television-receiver TV, and the sound signal is inputted into the audio component stereo ST, the video signal and sound signal of game machine G shall be similarly outputted to digital videocassette recorder VCR-B, and it shall be recorded on videotape in this digital videocassette recorder VCR-B.

[0054] To that to which such a video signal and a sound signal are connected, the technique of visualization of the connection state of the flow of a logical video signal and a sound signal is made reference, and drawing 4 and drawing 5 are explained.

[0055] First, the logical address table for controlling the number of connection of the AV equipment connected to RAM17 of a control circuit 11 shown in drawing 2 now and each AV equipment is created (step ST 1). This is required in order to use the P1394 interface 23 and to start a transaction to a target, and it can be collected using the P1394 interface 23.

[0056] Next, the kind of AV equipment is asked to each AV equipment (step ST 2). In case this visualizes an AV equipment from the logical address to an icon, it is needed.

[0057] In a step ST 3, what signal is now outputted to which channel, and it is asked which is the logical address of the AV equipment of the output place. Namely, From : (from which device) Content : (the kind of source, Video, Audio, Audioand Video etc) Channel : (channel of the source)

To : (to which device)

It asks to all the AV equipments to which such information is connected, and the table of a topology is created on RAM17 of a control circuit 11. for example

From:GAME Content:Video	Channel:10 To:TV
From:GAME Content:Video and Audio	Channel:10 To:DVCR1
From:GAME Content:Video	Channel:10 To:STEREO
From:DCAM Content:Video and Audio	Channel:20 To:DVCR2

[0058] Thus, while always being able to grasp two or more newest AV equipments connected to the control center CC which has a television receiver, the connection state of the flow of the AV equipment connected on the screen using GUI (graphic user interface) using the logical address table and signal I/O table of each of these devices, its sound signal, and a video signal is drawn.

[0059] Namely, it draws on the screen of television-receiver TV by making a list of an AV equipment into an icon from the correspondence table of the logical address of all the AV equipments that were obtained in the above-mentioned step ST 1 – a step ST 3 and that are connected, and the kind of model (step ST 4). The device is given so that it may not lap using a moderate algorithm about the drawing position of this icon. If it is Camcorder CAM, the graphic animation showing the character called "DCAM" and a camcorder will be drawn, if drawing is the digital videocassette recorder VCR as shown in drawing 4, the graphic animation showing the character called "DVCR1" and "DVCR2" and a recorder will be drawn, if it is game machine G, the graphic animation showing the character called "G" and a game machine will be drawn, and if it is the audio component stereo ST, the graphic animation showing the character and audio component stereo of "ST".

[0060] And in the above-mentioned step ST 1 – a step ST 3, the flow of a sound signal and a video signal is displayed (step ST 5), the correspondence table, i.e., the signal I/O table, of the logical address of all the AV equipments connected, and the kind of model

[0061] As shown in drawing 4, the display of the flow of this sound signal and a video signal expresses the flow of a sound signal, and the flow of a video signal with an arrow, and the flow of a signal has a look at it regardless of the connection state of a device, and it is known easily. And the arrow which shows the flow of a sound signal and a video signal is displayed by according to color, and is still more legible. If it is a sound signal and these color exceptions are red and a video signal, they should just be taken as yellow. in addition, without being limited to the specification according to this color, specify, for example according to a model, only the signal from a specific model is specified by according to specific color, or it comes out not to mention being made to give specific color temporarily.

[0062] Thus, if the visualization which thought functionality as important by displaying on a screen the connection state of the flow of the sound signal which paid its attention to the

function of each AV equipment, and a video signal is attained and a video signal and a sound signal are carried out according to a color, without being related to physical connection of two or more AV equipments connected in any way, grasping [ of a connection state ] will become still easier.

[0063] Moreover, correspondence with the physical topology between two or more AV equipments connected and the logical topology which consists of a flow of the video signal from an AV equipment and a sound signal is attained, and it comes to be able to perform grasp of the connection condition of the user corresponding to AV equipment environment.

[0064] Here, when a physical connection state changes between the AV equipments connected, or when a change is made by the control center CC side which has television-receiver TV, a change of the logical address table of each AV equipment and a signal I/O table registered into the above RAM 17 is made automatically, and it is re-drawn.

[0065] Next, in this re-drawing by which a setting change was made automatically, or drawing of which setting change is not done, about making a setting change of the connection state of the flow of a sound signal and a video signal, looking at a screen, drawing 6 and drawing 7 are made reference, and are explained below.

[0066] First, it is the same to have made it make it draw by GUI using the logical address table and signal I/O table of an AV equipment of the newest explained using drawing 4 and drawing 5 which are connected. It is because confusion is produced and the function of AV system is made to fall remarkably, when there is a difference between the initial entry of GUI and an actual initial entry, in case a setting change of the topology of a signal will be made using remote control or a control panel, if it does not do in this way.

[0067] That is, remote control performs the signal change by GUI. This remote control shall move cursor on an icon, as it shall have the function of the cursor button which can move in the eight directions, a menu button, and a determination button and is shown in drawing 6.

[0068] In addition, drawing 6 makes only a physical connection state draw on explanation, and the connection state of the flow of a sound signal and a video signal has not drawn.

[0069] First, although not illustrated, it is made the menu which changes the connection state of the flow of a signal by operation of the menu button of remote control, and the AV equipment (it sets in the example and is a game machine) of the input origin which shows cursor to drawing 6 is specified (step ST 10).

[0070] And it is made the mode which pushes the menu button of remote control and changes voice to an image, and selection of only "voice, an image", "voice", and an "image" is performed. "Voice and the image" are chosen in the example shown in drawing 6 (step ST 11).

[0071] Next, if the AV equipment of an output place is specified with cursor, the graphic of the direction of the arrow which shows the flow of a signal will move (step ST 12). If the AV equipment which a video signal or a sound signal cannot actually receive is specified at this time, the arrow which shows the flow of a sound signal and a video signal will move. In drawing 6, the AV equipment of an output place is digital videocassette recorder VCR-A (DVCR1), and can accept now both sound signal and video signal.

[0072] Thus, after specifying the AV equipment of an output place, a user needs to do operation divided into the three following modes (step ST 13).

[0073] (1) When it is the change of a signal (step ST 14)

In for specification of the AV equipment of an output place changing a signal, connection is made from the AV equipment of the change place newly specified to be cutting with the AV equipment of the change origin connected before.

[0074] (2) When it is separation of a signal (step ST 15)

In separation of the signal of the AV equipment connected, cutting of a signal is required from the AV equipment of the change origin to detach.

[0075] (3) When it is the addition of connection of an AV equipment (step ST 16)

In the addition of connection of an AV equipment, connection is made from the AV equipment of the specified change place.

[0076] The above (1) After making connection which chose any of - (3) they were, updating by the initial entry on the screen by change of connection is performed (step ST 17).

[0077] Here, it will be canceled, if addition of a signal and deletion are performed by pushing "determination" button and it pushes once again, in case [ above-mentioned ] a change is made. Therefore, deletion of connection will be performed if determination is pushed when the arrow of cursor is moved to the already connected AV equipment.

[0078] And if the above-mentioned change is completed, a menu button will be pushed and changed and it will escape from the mode. Thus, a signal can be changed using GUI. as other methods, it comes out not to mention deformation of the drag-and-drop technique of a computer being sufficient

[0079]

[Effect of the Invention] the video signal between the AV equipments to which the AV system which consists of a display unit connected with two or more AV equipments concerning this invention as explained above is connected -- and -- or there is an effect which says that the topology of the flow of a user's video signal and a sound signal can grasp easily by visualizing the I/O situation of a sound signal and having displayed the flow of a video signal and a sound signal by according to color with voice and an image

[0080] Moreover, correspondence with the physical topology between AV equipments and the logical topology which is the flow of a video signal and a sound signal is attained, and there is an effect referred to as being able to carry out while a setup of AV system environment looks at a screen.

[0081] Furthermore, there is an effect which says that grasp of the situation of the topology of the flow of the video signal corresponding to the environment by two or more AV equipments connected by digital bus and a sound signal becomes easy.

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[Translation done.]

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**TECHNICAL FIELD**

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[The technical field to which invention belongs] the video signal between the AV equipments connected on the screen of a display unit in the display unit to which this invention connected two or more AV equipments -- and -- or it is related with AV system which displayed the connection state of the flow of a sound signal, and enabled setting change of a connection state on the screen suitably

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**PRIOR ART**

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[Description of the Prior Art] When connecting AV equipments, such as graphic display machines and videos, such as the display unit linked to two or more AV equipments which can be set on the conventional technology, for example, a television receiver etc., and audio equipment, changing the sound signal of each AV equipment, and a video signal to an input and an output and performing reproduction of an image, videotape recording, etc., the bond frog method is common knowledge directly about the topology between each AV equipment. for example, "video -- video" -- the case where he wants to dub in between -- direct -- " -- video out -- the purpose called dubbing can be attained by connecting and changing the cable of video in" and performing reproduction and videotape-recording recording, respectively

[0003] Moreover, there is also the method of realizing combining the terminal of the input which each AV equipment has, and an output. For example, when outputting the image output of a videocassette recorder to a television receiver and outputting voice to a stereo, it can realize by changing the voice input of a stereo to an external input, and changing the input change of a television receiver to an external input. When the number of the AV equipments to connect increases, there is also the method of connecting and changing the voice of each AV equipment and all the image inputs to AV selector.

[0004] Furthermore, visual [ operate / by GUI on a television receiver (Graphic User Interface) / by outputting the video signal from such an AV selector on a television receiver for example, ] A touch (Visual Touch) also exists.

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**EFFECT OF THE INVENTION**

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[Effect of the Invention] the video signal between the AV equipments to which the AV system which consists of a display unit connected with two or more AV equipments concerning this invention as explained above is connected -- and -- or there is an effect which says that the topology of the flow of a user's video signal and a sound signal can grasp easily by visualizing the I/O situation of a sound signal and having displayed the flow of a video signal and a sound signal by according to color with voice and an image

[0080] Moreover, correspondence with the physical topology between AV equipments and the logical topology which is the flow of a video signal and a sound signal is attained, and there is an effect referred to as being able to carry out while a setup of AV system environment looks at a screen.

[0081] Furthermore, there is an effect which says that grasp of the situation of the topology of the flow of the video signal corresponding to the environment by two or more AV equipments connected by digital bus and a sound signal becomes easy.

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**TECHNICAL PROBLEM**

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[Problem(s) to be Solved by the Invention] However, in AV system in the conventional technology which gave [ above-mentioned ] explanation, when a video signal and a sound signal are analog signals, in case an I/O signal is changed on AV selector, there is a trouble referred to as considering a video signal and a sound signal to be the same channels, and changing them. [0006] What visualizes the flow of I/O of a video signal and a sound signal intelligibly temporarily though the fine change of the video signal for every AV equipment and a sound signal can be performed does not exist.

[0007] When the environment which connected the AV equipment is moreover digitized, especially a topology with the as logical sound signal [ a video signal and a sound signal ] naturally at one physical path cord between AV equipments as the topology of a cable physical in transmission and reception becoming possible together becomes unnecessary to be in agreement, and there is a trouble referred to as unsolvable with the concept of the conventional AV switcher.

[0008] therefore, the display unit linked to two or more AV equipments -- setting -- especially -- a video signal -- and -- or it has the technical problem which the connection state of the flow of a sound signal must solve in the composition it enabled it to understand easily by viewing

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MEANS

[Means for Solving the Problem] the video signal between two or more AV equipments to which the display unit which connected with two or more AV equipments AV system which consists of a display unit connected with two or more AV equipments concerning this invention in order to solve the above-mentioned technical problem is connected -- and -- or it is having displayed the connection state of a sound signal on the screen, and it is making it display according to a color preferably, and having been made to make a setting change on the screen suitably [0010] moreover, the video signal between two or more AV equipments and two or more AV equipments which connected the connectable display unit through the digital interface -- and -- or it is displaying the connection state of a sound signal on a screen, and displaying by according to color preferably, and having been made to make a setting change on the screen suitably [0011] The display unit which connected two or more AV equipments made the above-mentioned composition can view easily the topology of a video signal and a sound signal, i.e., the flow state of a signal, on a screen, and can perform now easily correspondence with the physical connection state between two or more AV equipments, and the theoretical connection state which is the flow of a video signal and a sound signal.

[0012]

[Embodiments of the Invention] The gestalt of desirable operation of AV system which consists of a display unit linked to two or more AV equipments concerning this invention has the composition of having connected the AV equipment of variety a large number through the digital interface (henceforth 1394IF) based on IEEE1394 specification, as shown in drawing 1.

[0013] 1394IF is explained here. 1394IF is the so-called serial buses which can connect two or more AV equipments by the daisy chain, and each AV equipment forms the node in 1394IF. A branch can also be taken out from each node. Connection of each AV equipment is arbitration unless a loop is formed.

[0014] In drawing 1, two branches have come from television-receiver TV, and one of them is connected with the digital camcorder DCAM. namely, to another branch Digital videocassette recorder VCR-A, VCR-B, and VCR-C, A digital video disc DVD, game machine G, and Telephone TEL Facsimile FAX, the music disk-swapping machine MDC, the digital audio tape recorder DAT and the compact disk exchange CDC, Printer P, and infrared equipment IRU are connected to the daisy chain by the P1394 cable C.

[0015] 1394IF which has such a function consists of the same connector connected to the ends of the P1394 cable C of the 6 heart, and a cable, the LSI-ized physical layer which was connected to each connector, an LSI-ized link layer which was connected with the physical layer, and a transaction layer connected with the link layer. A transaction layer consists of a firmware.

[0016] The P1394 cable C consists of two pairs of shielding wire, and two power supply lines. Two of pairs of it are with the data line and a strobe line, they are used for data transfer, and are used as other power supply lines. Therefore, since the device on which the power supply has fallen can also make a signal bypass, it can send a signal to a previous device from the device on which the power supply has fallen.

[0017] The transceiver is built in the connector and the repeater is formed in it by this

transceiver and the P1394 cable C. The end of a physical layer is connected with the P1394 cable C, and the other end is connected with the link layer. A physical layer decrypts the code data received from the link layer to an electrical signal, and sends them out to the P1394 cable C while it encodes the electrical signal inputted from the P1394 cable C and sends it to a link layer. A physical layer performs the below-mentioned bus arbitration etc. again.

[0018] A link layer decodes the packet received from the transaction layer while creating a packet based on the data encoded by the physical layer and transmitting to a transaction layer. Moreover, a link layer controls the transfer cycle of a packet.

[0019] 1394IF constituted as mentioned above has the following feature.

(1) Since the connection between AV equipments is serial, it can communicate with other AV equipments without all AV equipments' needing a switch connection like AV switcher prepared in the above-mentioned conventional television-receiver TV.

(2) The AV equipment in AV system is not fixed, but it can equip or secede from it freely in the arbitrary positions in AV system by \*\*\*\*(ing) a connector. At this time, it reconfigures ID of each AV equipment automatically.

[0020] (3) It has a bus arbitration (mediation) function for a specific AV equipment not monopolizing a serial bus. This transmits data per packet and the packet size is restricted to a maximum of 512 bytes (in the case of a 100M bit per second transfer rate, it is equivalent to about 40micro second). As for each AV equipment, only each allocation time performs packet transmission in order of the node number specified.

[0021] (4) A packet is an always fixed time interval, and it has come to be unable to perform a transfer of other packets until it is sent out from a link layer and the transfer is completed. Each AV equipment will judge whether it is data required for itself, if a packet is received, and it processes or disregards it based on the judgment result.

[0022] (5) There are an ordinary packet, an urgent packet with a high priority, and the below-mentioned isochronous packet with a still higher priority in a packet.

(6) The P1394 cable C is thin, and since the connector is small, leading about of the P1394 cable C and its attachment and detachment of a connector are easy for it. Moreover, cost is cheap.

[0023] (7) The transfer rate of a signal is quick as compared with the conventional serial transfer. This is because it reads with DS link method which sends a signal by serial transfer (transfer per bit) using one pair of data lines, and one pair of strobe lines, and follows the rule of "reading the data of the data line when one of the potentials of the data line or a strobe line change." This DS link method corresponds to the time shake of the potential of the data line. It becomes unnecessary to insert the conventional start bit and conventional stop bit like a serial transfer (for example, RS232C) at intervals of 8 bits by this, and a transfer rate improves.

[0024] Next, the control center CC side of a television receiver is explained to the Lord of AV system which consists of a display unit linked to two or more AV equipments connected with the digital interface based on IEEE1394 specification.

[0025] in addition, it comes out not to mention all based on this specification being contained, without being limited to this, although explained on the basis of IEEE1394 specification in the gestalt of this operation

[0026] AV system equipped with the display unit linked to two or more AV equipments is constituted by a control center CC, and the P1394 cable C and two or more AV equipments (for example, the digital videocassette recorder VCR) as shown in drawing 2.

[0027] The control center CC consists of a TV circuit 1, a control circuit 11, and a P1394 interface 23.

[0028] The TV circuit 1 has the video-signal processor and the sound signal processor like the usual TV circuit. a video-signal processor The image decoder 2 which decodes the digital video signal inputted from the P1394 interface, D/A converter 3 which changes into an analog signal the video signal decoded by the image decoder 2, The picture multiplexing processing section 4 equipped with GUI (graphic user interface) which superimposes the analog video signal changed by D/A converter 3, the message signal from a display controller mentioned later (superimposition), It consists of the display-processing section 5 which reorganizes to a display the image data processed in the picture multiplexing processing section 4, and a receiving set 6

which displays the output of the display-processing section 5 on screens, such as the Braun tube.

[0029] Moreover, the sound signal processor of the TV circuit 1 consists of the voice decoder 7 which decodes the digital sound signal inputted from the P1394 interface 23, D/A converter 8 which changes into an analog signal the sound signal decoded by the voice decoder 7, sound signal amplifier 9 which amplifies the analog sound signal changed by D/A converter 8, and a loudspeaker 10 which changes into sound the sound signal amplified with the sound signal amplifier 9.

[0030] The bus 13 to which a control circuit 11 connects between CPU12, CPU12, and the P1394 interfaces 23, The I/O circuit 14 which intervenes between the image decoder 2 and the voice decoder 7, and a bus 13, The display controller 15 and VRAM16 which intervene between a bus 13 and the picture multiplexing processing section 4, The nonvolatile RAM 17 connected to the bus 13, respectively, and the timer 18 connected through the I/O circuit 24, ROM19 and the remote control signal decoder 20 which receives and decodes the data from a remote control signal and a bus 13, It consists of an I/O circuit 21 which transmits and receives the data on a bus 13 to this remote control signal decoder 20, and portable remote control 22 which transmits a remote control signal.

[0031] CPU12 performs the program mentioned later. A bus 13 is the usual CPU bus. The I/O circuit 14 controls the timing of input and output of the image decoder 2 and the voice decoder 7 by the bottom of control of CPU12.

[0032] A display controller 15 creates the message data for one screen of a receiving set 6 etc. on VRAM16 under control of CPU12, and sends this to the picture multiplexing processing section 4.

[0033] Nonvolatile RAM 17 has memorized information, such as a history of the AV equipment composition connected to the P1394 interface 23. A timer 18 consists of a counter and carries out counting of the real time. ROM19 is memory only for read-out which stores a program.

[0034] The P1394 interface 23 has connector 23a connected to the circuit LSI-ized by IEEE1394 bus specification and this circuit. The plug of the P1394 cable C is inserted in this connector 23a. The function of this P1394 interface 23 is carried also in the AV equipment side connected.

[0035] The P1394 cable C is a cable which consists of six core wires, and has connected between a control center CC and AV equipments to series one by one. The P1394 cable C is connected one by one so that a loop may not be made, as mentioned above. In addition, in drawing 2 and drawing 3 , in order to explain the summary of this invention, it has the composition of having connected three sets of digital videocassette recorder VCR-A, VCR-B, and VCR-C to series, having connected game machine G to the anode side of another side, and having connected the audio deck ST to one anode side further at the anode side of another side of digital videocassette recorder VCR-B.

[0036] As already stated as a feature of IEEE1394 specification, in this P1394 interface 23, it detects the AV equipment newly having been connected or having been removed by the P1394 cable connected to the socket, and has in it the function to tell CPU12 about that.

[0037] That is, the P1394 interface 23 sends the signal (henceforth a connection signal) which shows that to CPU12, when an AV equipment is newly connected or removed.

[0038] CPU12 has the function to perform change of AV equipment composition, a display, the automatic setting of a tuner and the display that are the setup 18 of the newly connected AV equipment, for example, a timer, and a channel selection means, the display of the removed AV equipment, etc., by making the above-mentioned connection signal into a trigger.

[0039] two or more image data and voice data from two or more AV equipments connected to the control center CC side which consists of such composition outside through the P1394 cable, for example, digital videocassette recorder VCR-A, and VCR-B -- a digital signal -- a packet -- it is-izing and transmitted

[0040] Here, since it mentioned above about packet-ization of image data and voice data, it omits. In the image decoder 2 which incorporates image data, it has simultaneously the function which can be decoded for the packet-ized animation of two or more channels.

[0041] This image decoder 2 is controlled from CPU12 through the I/O circuit 14, and can choose whether it chooses which image channel on the bus 13 of the P1394 interface 23 it is, and decodes. Moreover, in the voice decoder 7, the voice corresponding to the specific image channel shall be decoded. That is, it has the function which chooses the specific channel of the video signal transmitted through the P1394 interface 23, and a sound signal.

[0042] The data of an image and voice are changed into an analog signal by D/A converters 3 and 8, respectively, an analog sound signal is outputted to a loudspeaker 10 through the sound signal amplifier 9, and an analog video signal is outputted to the screen of a receiving set 6 by the display-processing section 5.

[0043] Graphical data, such as an icon display of the AV equipment it is displayed on the screen of a television receiver that mentioned above on the other hand, shall be stored in ROM19, and this data is written in VRAM16 through a bus 13. The VRAM address which is a display position at the time of being written in is controlled by CPU12 through a bus 13. When processing of a superimposition etc. is performed by the picture multiplexing processing section 4, image data and graphical data are multiplexed and it is displayed on a receiving set 6 by the display controller 15 here.

[0044] On the other hand, the signal by remote control 22 is processed by the remote control signal decoder 20, and is analyzed by CPU12 as a remote control code through the I/O circuit 21 for whether it is that which button on remote control 22 was pushed. A timer 18 is used in order to process interruption of fixed time etc., and it is controlled by CPU12 through the I/O circuit 24.

[0045] On the screen of television-receiver TV possessing the control center CC which consists of such composition, a list indication which shows the connection state of the flow of the video signal from two or more connected AV equipments and the flow of a sound signal can be given. It explains in full detail below.

[0046] In addition, in an example, as described above, as shown in drawing 3, the connection state of the flow of a video signal and a sound signal will be considered through the P1394 cable C two or more AV equipments and here on the basis of two sets of digital videocassette recorder VCR-A, VCR-B, game machine G, and the composition that connected the audio component stereo ST with Camcorder CAM.

[0047] And as mentioned above, the terminator attached to cable both termination like [ the connection method between AV equipments is connected by the daisy chain which was similar with connection methods, such as SCSI and ] SCSI is unnecessary, and has composition based on IEEE1394 specification.

[0048] the capacity which the function of digital videocassette recorder VCR-A and VCR-B has encoding/decoding capacity of AV stream identifier, and packetizes the digital image data which are a record medium, and which are recorded, for example on the magnetic tape, and transmits on the bus 13 of the P1394 interface 23 -- a packet -- it has the capacity which decodes the image data on the bus 13--izing [ a bus ] and sent, and records on the magnetic tape which is a record medium

[0049] Moreover, a certain channel shall be assigned to digital videocassette recorder VCR-A and VCR-B. For example, digital videocassette recorder VCR-A assigns "a channel 10" and digital videocassette recorder VCR-B like "a channel 20."

[0050] About game machine G, it shall have the function in which AV stream identifier encodes a video signal and a sound signal, and shall not have the function which decodes.

[0051] It shall be related with the audio deck ST and shall have the function which encodes / decodes only voice data.

[0052] A topology with the physical feature as a network through the bus connected by the daisy chain based on IEEE1394 specification when each AV equipment had such a function. If each AV equipment which especially the logical topology of a video signal and a sound signal does not need to be in agreement, and is connected is equipped with a P1394 interface, and the encoder / decoder function of the stream identifier in packet communication Even if the video signal and the sound signal exist in which portion that forms a network, it is shown that it can transmit and receive. Here, if a stream identifier is the case of a video signal, it is included in the

specific position of a video signal, and consists of data constellations which determine an image method, quality of image, etc.

[0053] Now, in AV system which has the physical connection state shown in drawing 3 in the form of this operation, the digital camcorder CAM shall be in a reproduction state, and the video signal shall be inputted into digital videocassette recorder VCR-A. Moreover, it shall suppose that the video signal of game machine G is inputted into television-receiver TV, and the sound signal is inputted into the audio component stereo ST, the video signal and sound signal of game machine G shall be similarly outputted to digital videocassette recorder VCR-B, and it shall be recorded on videotape in this digital videocassette recorder VCR-B.

[0054] To that to which such a video signal and a sound signal are connected, the technique of visualization of the connection state of the flow of a logical video signal and a sound signal is made reference, and drawing 4 and drawing 5 are explained.

[0055] First, the logical address table for controlling the number of connection of the AV equipment connected to RAM17 of a control circuit 11 shown in drawing 2 now and each AV equipment is created (step ST 1). This is required in order to use the P1394 interface 23 and to start a transaction to a target, and it can be collected using the P1394 interface 23.

[0056] Next, the kind of AV equipment is asked to each AV equipment (step ST 2). In case this visualizes an AV equipment from the logical address to an icon, it is needed.

[0057] In a step ST 3, what signal is now outputted to which channel, and it is asked which is the logical address of the AV equipment of the output place. Namely, From : (from which device) Content : (the kind of source, Video, Audio, Audioand Video etc)

Channel : (channel of the source)

To : (to which device)

It asks to all the AV equipments to which such information is connected, and the table of a topology is created on RAM17 of a control circuit 11. for example

From:GAME Content:Video	Channel:10 To:TV
From:GAME Content:Video and Audio	Channel:10 To:DVCR1
From:GAME Content:Video	Channel:10 To:STEREO
From:DCAM Content:Video and Audio	Channel:20 To:DVCR2

[0058] Thus, while always being able to grasp two or more newest AV equipments connected to the control center CC which has a television receiver, the connection state of the flow of the AV equipment connected on the screen using GUI (graphic user interface) using the logical address table and signal I/O table of each of these devices, its sound signal, and a video signal is drawn.

[0059] Namely, it draws on the screen of television-receiver TV by making a list of an AV equipment into an icon from the correspondence table of the logical address of all the AV equipments that were obtained in the above-mentioned step ST 1 – a step ST 3 and that are connected, and the kind of model (step ST 4). The device is given so that it may not lap using a moderate algorithm about the drawing position of this icon. If it is Camcorder CAM, the graphic animation showing the character called "DCAM" and a camcorder will be drawn, if drawing is the digital videocassette recorder VCR as shown in drawing 4, the graphic animation showing the character called "DVCR1" and "DVCR2" and a recorder will be drawn, if it is game machine G, the graphic animation showing the character called "G" and a game machine will be drawn, and if it is the audio component stereo ST, the graphic animation showing the character and audio component stereo of "ST"

[0060] And in the above-mentioned step ST 1 – a step ST 3, the flow of a sound signal and a video signal is displayed (step ST 5), the correspondence table, i.e., the signal I/O table, of the logical address of all the AV equipments connected, and the kind of model

[0061] As shown in drawing 4, the display of the flow of this sound signal and a video signal expresses the flow of a sound signal, and the flow of a video signal with an arrow, and the flow of

a signal has a look at it regardless of the connection state of a device, and it is known easily. And the arrow which shows the flow of a sound signal and a video signal is displayed by according to color, and is still more legible. If it is a sound signal and these color exceptions are red and a video signal, they should just be taken as yellow. in addition, without being limited to the specification according to this color, specify, for example according to a model, only the signal from a specific model is specified by according to specific color, or it comes out not to mention being made to give specific color temporarily

[0062] Thus, if the visualization which thought functionality as important by displaying on a screen the connection state of the flow of the sound signal which paid its attention to the function of each AV equipment, and a video signal is attained and a video signal and a sound signal are carried out according to a color, without being related to physical connection of two or more AV equipments connected in any way, grasping [ of a connection state ] will become still easier.

[0063] Moreover, correspondence with the physical topology between two or more AV equipments connected and the logical topology which consists of a flow of the video signal from an AV equipment and a sound signal is attained, and it comes to be able to perform grasp of the connection condition of the user corresponding to AV equipment environment.

[0064] Here, when a physical connection state changes between the AV equipments connected, or when a change is made by the control center CC side which has television-receiver TV, a change of the logical address table of each AV equipment and a signal I/O table registered into the above RAM 17 is made automatically, and it is re-drawn.

[0065] Next, in this re-drawing by which a setting change was made automatically, or drawing of which setting change is not done, about making a setting change of the connection state of the flow of a sound signal and a video signal, looking at a screen, drawing 6 and drawing 7 are made reference, and are explained below.

[0066] First, it is the same to have made it make it draw by GUI using the logical address table and signal I/O table of an AV equipment of the newest explained using drawing 4 and drawing 5 which are connected. It is because derangement is produced and the function of AV system is made to fall remarkably, when there is a difference between the initial entry of GUI and an actual initial entry, in case a setting change of the topology of a signal will be made using remote control or a control panel, if it does not do in this way.

[0067] That is, remote control performs the signal change by GUI. This remote control shall move cursor on an icon, as it shall have the function of the cursor button which can move in the eight directions, a menu button, and a determination button and is shown in drawing 6.

[0068] In addition, drawing 6 makes only a physical connection state draw on explanation, and the connection state of the flow of a sound signal and a video signal has not drawn.

[0069] First, although not illustrated, it is made the menu which changes the connection state of the flow of a signal by operation of the menu button of remote control, and the AV equipment (it sets in the example and is a game machine) of the input origin which shows cursor to drawing 6 is specified (step ST 10).

[0070] And it is made the mode which pushes the menu button of remote control and changes voice to an image, and selection of only "voice, an image", "voice", and an "image" is performed. "Voice and the image" are chosen in the example shown in drawing 6 (step ST 11).

[0071] Next, if the AV equipment of an output place is specified with cursor, the graphic of the direction of the arrow which shows the flow of a signal will move (step ST 12). If the AV equipment which a video signal or a sound signal cannot actually receive is specified at this time, the arrow which shows the flow of a sound signal and a video signal will move. In drawing 6, the AV equipment of an output place is digital videocassette recorder VCR-A (DVCR1), and can accept now both sound signal and video signal.

[0072] Thus, after specifying the AV equipment of an output place, a user needs to do operation divided into the three following modes (step ST 13).

[0073] (1) When it is the change of a signal (step ST 14)

In for specification of the AV equipment of an output place changing a signal, connection is made from the AV equipment of the change place newly specified to be cutting with the AV equipment

of the change origin connected before.

[0074] (2) When it is separation of a signal (step ST 15)

In separation of the signal of the AV equipment connected, cutting of a signal is required from the AV equipment of the change origin to detach.

[0075] (3) When it is the addition of connection of an AV equipment (step ST 16)

In the addition of connection of an AV equipment, connection is made from the AV equipment of the specified change place.

[0076] The above (1) After making connection which chose any of – (3) they were, updating by the initial entry on the screen by change of connection is performed (step ST 17).

[0077] Here, it will be canceled, if addition of a signal and deletion are performed by pushing "determination" button and it pushes once again, in case [ above-mentioned ] a change is made. Therefore, deletion of connection will be performed if determination is pushed when the arrow of cursor is moved to the already connected AV equipment.

[0078] And if the above-mentioned change is completed, a menu button will be pushed and changed and it will escape from the mode. Thus, a signal can be changed using GUI. as other methods, it comes out not to mention deformation of the drag-and-drop technique of a computer being sufficient

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**DESCRIPTION OF DRAWINGS**

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**[Brief Description of the Drawings]**

[Drawing 1] It is the block diagram having shown the composition of the whole AV system which connected two or more AV equipments concerning this invention.

[Drawing 2] It is the block diagram of the control center equipped with this television receiver.

[Drawing 3] It is explanatory drawing having shown the connection state of this television receiver and two or more AV equipments.

[Drawing 4] It is explanatory drawing having shown the flow of the signal of two or more AV equipments on this screen.

[Drawing 5] It is a flow chart view about the flow of the signal in this drawing 4.

[Drawing 6] It is explanatory drawing having shown signs that the flow of the signal of two or more AV equipments was changed on this screen.

[Drawing 7] It is a flow chart view about the flow of the signal in this drawing 6.

**[Description of Notations]**

- 1 TV Circuit
- 2 Image Decoder
- 3 D/A Converter
- 4 Picture Multi-processing Section
- 5 Display-Processing Section
- 6 Receiving Set
- 7 Voice Decoder
- 8 D/A Converter
- 9 Sound Signal Amplifier
- 10 Loudspeaker
- 11 Control Circuit
- 12 CPU
- 13 Bus
- 14 I/O Circuit
- 15 Display Controller
- 16 VRAM
- 17 RAM
- 18 Timer
- 19 ROM
- 20 Remote Control Signal Decoder
- 21 I/O Circuit
- 22 Remote Control
- 23 P1394 Interface
- 24 I/O Circuit
- 25 Parent Screen
- 26 Virtual Screen
- 27 Icon
- 28 Cursor

29 Child Screen  
VCR-A, VCR-B, VCR-C Digital videocassette recorder  
TV Television receiver  
VTR Video tape recorder  
DCAM Digital camera  
DVD Digital video disc  
G Game machine  
TEL Telephone  
FAX Facsimile  
MDC Music disk-swapping machine  
DAT Digital audio tape recorder  
CDC Compact disk exchange  
P Printer  
IRU Infrared equipment

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[Translation done.]

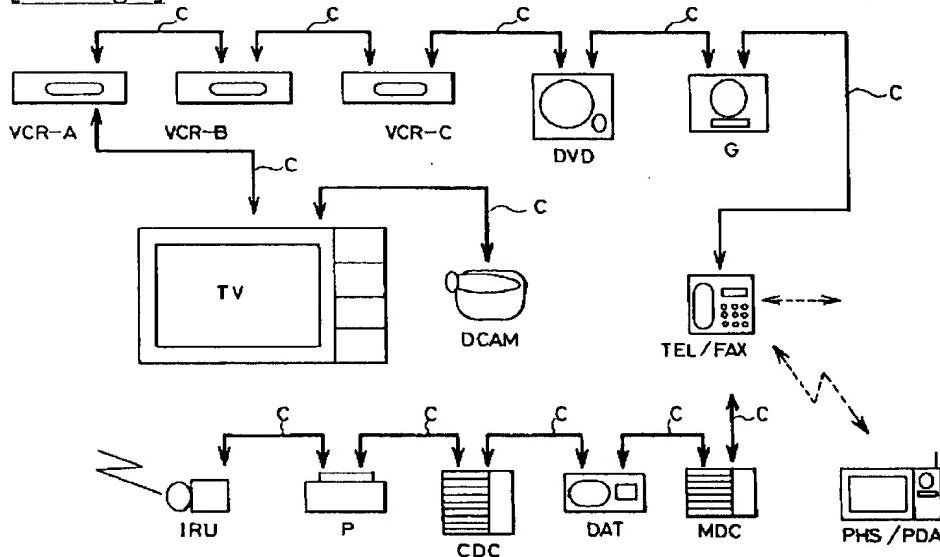
\* NOTICES \*

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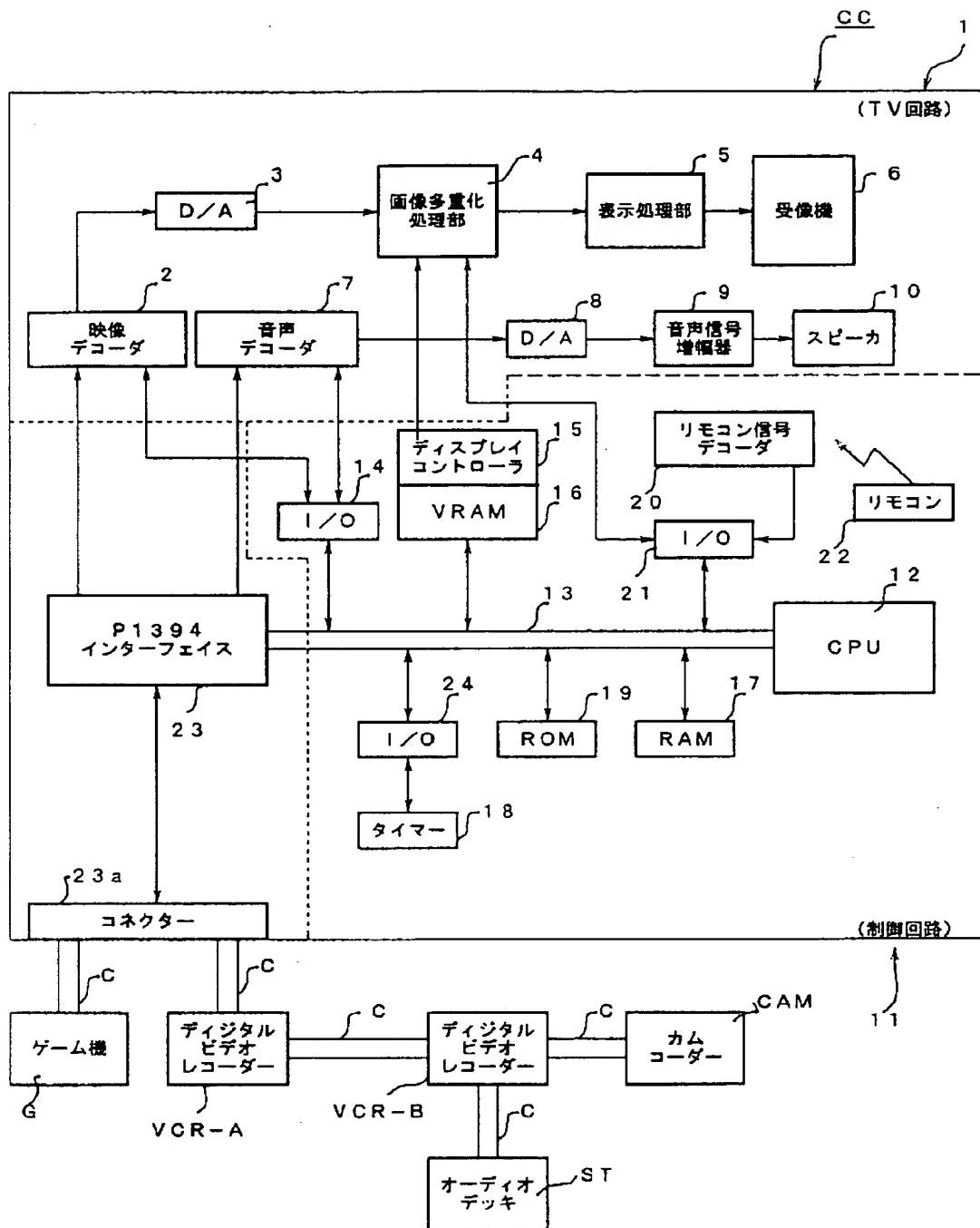
1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

DRAWINGS

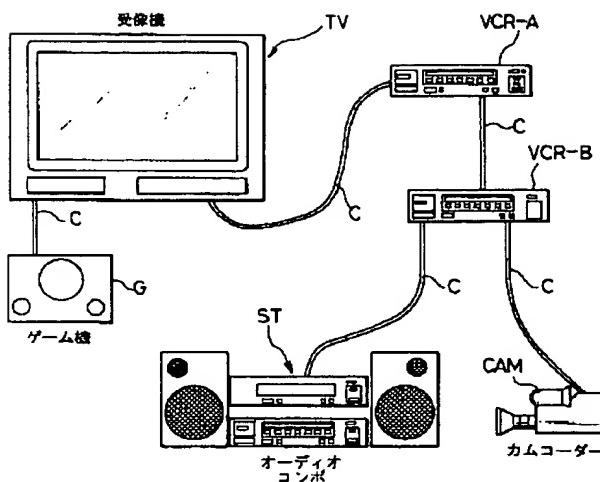
[Drawing 1]



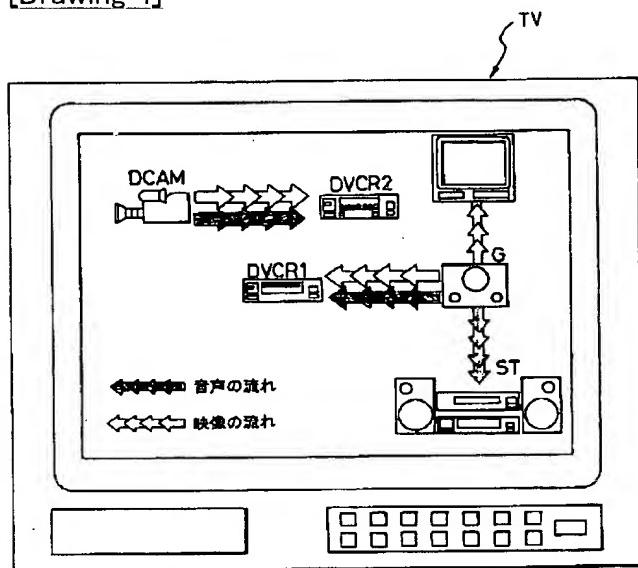
[Drawing 2]



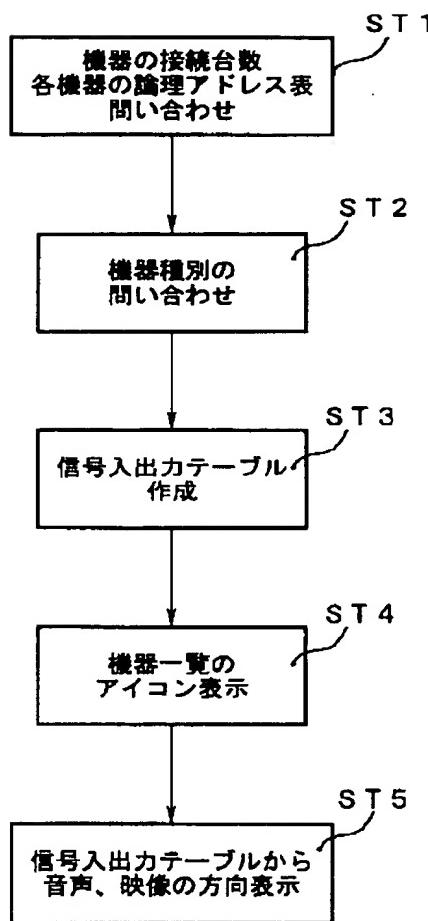
[Drawing 3]



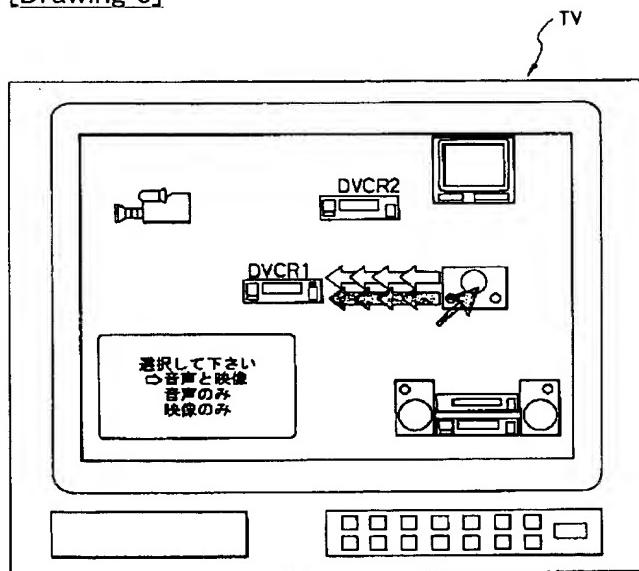
[Drawing 4]



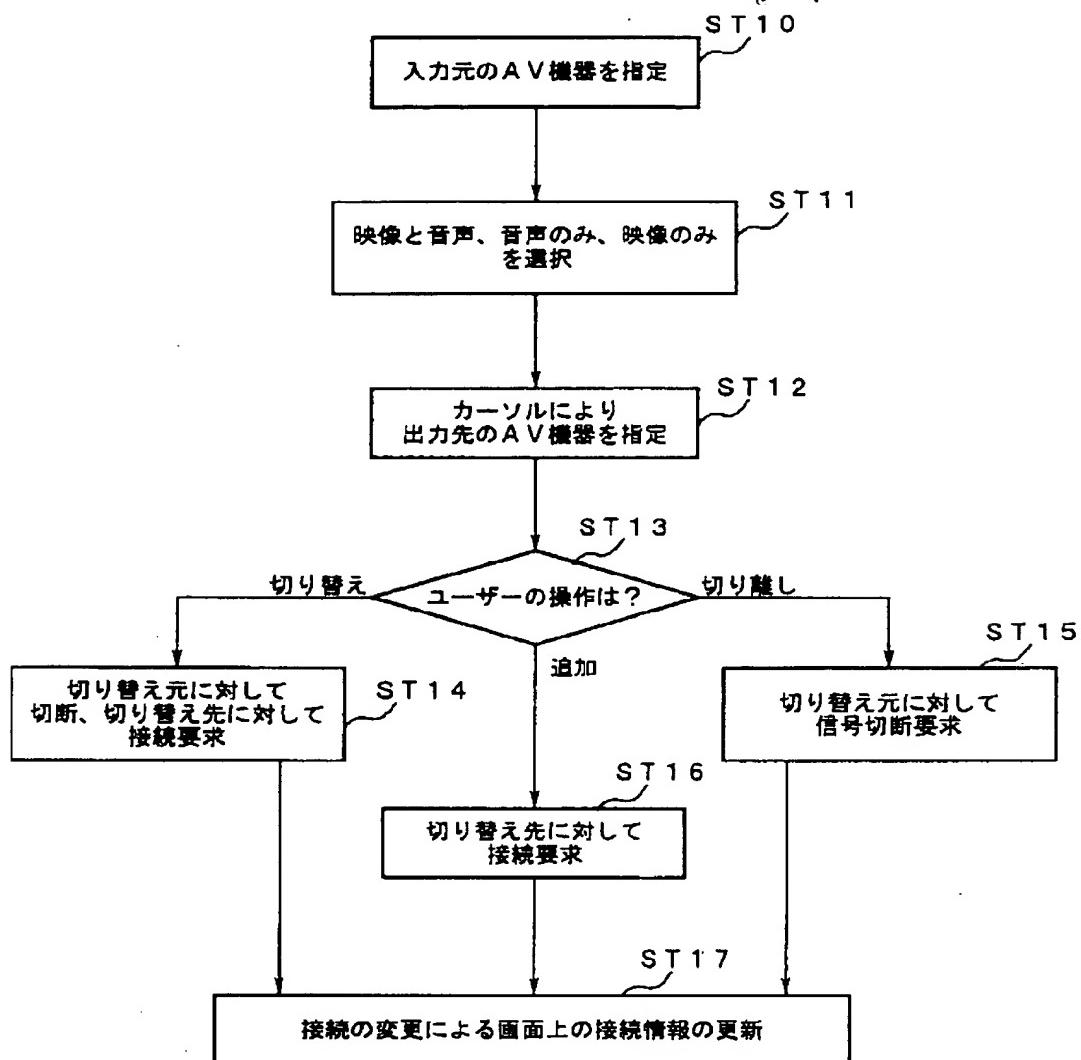
[Drawing 5]



[Drawing 6]



[Drawing 7]



[Translation done.]